

The Invention

The relates to the use of an alkyl ester of a fatty acid, wherein the alkyl group of the ester is an aliphatic hydrocarbon having from 4 to 8 carbon atoms alkyl esters, in foundry binder systems that cure in the presence of gaseous sulfur dioxide and a free radical initiator. Data indicate that the addition of these alkyl esters to the binder improve the tensile strength development and humidity resistance of cores and molds made with these binders.

DISCUSSION OF EXAMINER'S OFFICE ACTION

Objections to the Specification

The specification was objected to because the term "alkyl" was misspelled and the claim recited an epoxide equivalent weight that was not supported by the specification.

Applicants' response

Corrections have been made in the title and claim 3 was amended to overcome these objections.

Claim Objections

Claim 2 was objected to because the phrase "wherein the" was repeated. Claim 5 was objected to because the term "trimethylolpropane" was misspelled. The Examiner also objected to claim 12.

Applicants' response

Corrections were made to claims 2 and 5. Claim 12 was canceled.

Claim Rejections - 35 USC § 112, first paragraph

The following is a quotation of the first paragraph of 35 U.S.C. §112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-13 were rejected to because the phrase "effective amount of peroxide" was deemed indefinite. Claim 1 was rejected because the Examiner contended that the term "will cure" was indefinite. Claim 12 was also rejected for various reasons.

Applicants' Response

Corrections have been made to claims 3 and 1 according to the suggestions of the Examiner. Claim 12 was canceled.

Claim Rejections - 35 USC § 112, second paragraph

The following is a quotation of the second paragraph of 35 U.S.C. §112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the Applicants regards as their invention.

Claim 3 was rejected because the epoxide equivalent weight was not supported by the language of the specification.

Applicants' Response

Claim 3 was amended to make it consistent with the language in the specification.

Claim Rejections - 35 USC § 102 (e)

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 (e) that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 35 1(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 2 1(2) of such treaty in the English language.

Claims 1-13 are rejected under 3 U.S.C. 102 (e) as being anticipated by Woodson et al (US 6,604,567).

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102 (e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the

reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Woodson et al '567 discloses a foundry binder system and processes that read on the present claims (col. 4, lines 28-42; col. 12, line 26 to col. 14, line 9). Although not claimed by Woodson et al '567, its composition also includes 0-25 wt % of a solvent such as butyl tallate. It is further noted that the present use of open claim language "comprising" allows for the addition of other ingredients utilized by Woodson et al such as an alkyl silicate.

Applicants' response

Applicants submit that Woodson does not anticipate the subject matter of claims 1-11. Anticipation requires the disclosure, in a prior art reference, of each and every recitation as set forth in the claims. See *Titanium Metals Corp. v. Banner*, 227 USPQ 773 (Fed. Cir. 1985), *Orthokinetics, Inc. v. Safety Travel Chairs, Inc.*, 1 USPQ2d 1081 (Fed. Cir. 1986), and *Akzo N. V. v. U.S. International Trade Commissioner*, 1 USPQ2d 1241 (Fed. Cir. 1986). There must be no difference between the claimed invention and reference disclosure for an anticipation rejection under 35 U.S.C. 102. See *Scripps Clinic and Research Foundation v. Genetech, Inc.*, 18 U.S.P.Q. 2d 1001 (CAFC 1991) and *Studiengesellschaft Kohle GmbH v. Dart Industrie*, 220 USPQ 841 (CAFC 1984). Furthermore, each and every claim recitation must be considered in evaluating anticipation. See *Pac-Tec, Inc. v. Amerace Corp.*, 903 F. 2d 796, 14 USPQ2d 1871 (Fed. Cir 1990).

Woodson does not anticipate Applicants' invention because there are no examples in Woodson that utilize a butyl tallate or any other alkyl ester of a fatty acid wherein the alkyl group of the ester has from 4 to 8 carbon atoms.

The Examiner referred to column 4, lines 42-60 to support his rejection:

Although solvents are not required² for the reactive diluent, they may be used. Typical solvents used are generally polar solvents, such as liquid dialkyl esters, e.g. dialkyl phthalate of the type disclosed in U. S. Pat. No. 3,905,934, and other dialkyl esters such as dimethyl glutarate, dimethyl succinate, dimethyl adipate, and mixtures thereof. Esters of fatty acids, particularly rapeseed methyl ester and butyl tallate, are also useful solvents. Suitable aromatic solvents are benzene, toluene, xylene, ethylbenzene, and mixtures thereof. Preferred aromatic solvents are mixed solvents that have an aromatic content of at least 90% and a boiling point range of 138° C. to 232° C. Suitable aliphatic solvents include kerosene. Although the components can be added to the foundry aggregate separately, it is preferable to package the epoxy novolac resin and free radical initiator as a Part I and add to the foundry aggregate first. Then the ethylenically unsaturated material, as the Part II, either alone or along with some of the epoxy resin, is added to the foundry aggregate.

² Underlining added for emphasis.

Applicants submit that this disclosure does not anticipate the subject matter of claims 1-11 because the text says that solvents are not required and butyl tallate is mentioned along with a "laundry list" of other solvents. There is nothing in the text that suggests selecting butyl tallate from this laundry list of solvents.

Additionally, it should be noted that the Examiner issued a double patenting rejection based upon U.S. Patent 6,604,567. As a basis for his double patenting rejection, the Examiner made the following statements:

Claims 1-13 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-15 of U.S. Patent No. 6,604,567. Although the conflicting claims are not identical, they are not patentably distinct from each other because of the reasons given below.

US '567, like the present claims, discloses a foundry binder system comprising epoxy resin, acrylate, and peroxide. Although US '567 does not explicitly claim the use of an alkyl ester of a fatty acid, such is clearly within the scope of US '567's claims given the open claim language "comprising." In passing, it is noted that the specification refers to the addition of an alkyl ester of a fatty acid such as that presently claimed at col. 4, lines 28-50.

It is clear from this double patenting rejection that the subject matter of claims 1-11 is not the same as that claim in U.S. Patent 6,604,567.

Claim Rejections - 35 USC § 103 (a)

The following is a quotation of 35 U.S.C. §103(a), which forms the basis for all obviousness rejections Office action:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

There is no question that Applicants' process is novel. The only question is whether the process was obvious to the person of ordinary skill in the art (TPSOA). To establish a *prima facie* case of obviousness, three basic criteria must be met:

1. There must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings.
2. There must be a reasonable expectation of success.
3. The prior art reference (or references when combined) must teach or suggest all the claim limitations.

The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on Applicants' disclosure. *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q. 2d 1438 (Fed. Cir. 1991). See MPEP § 2143 - § 2143.03 for decisions pertinent to each of these criteria.

Claims 1-13 are rejected under 35 U.S.C. 103 (a) as being obvious over U.S. Patent No. 6,604,567. See the discussion set forth in paragraph 10 above.

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102 (e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). For applications filed on or after November 29, 1999, this rejection might also be overcome by showing that the subject matter of the reference and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person. See MPEP § 706.02(l)(1) and § 706.02(l)(2).

Applicants' response

A. TP SOA would not have been motivated to derive Applicants' invention.

Applicants submit that the subject matter of claims 1-11 is not obvious because TP SOA would not have been motivated by the '567 patent to use an alkyl ester of a fatty acid, wherein the alkyl group of the ester has from 4 to 8 carbon atoms. The text in the '567 patent related to the use of solvents says that solvents are not required. Furthermore, butyl tallate is only mentioned along with a "laundry list" of other solvents. There is

nothing in the text of the '567 patent that would motivate TPSOA to select butyl tallate or an other alkyl ester of a fatty acid, wherein the alkyl group of the ester has from 4 to 8 carbon atoms, from this laundry list of solvents.

B. TPSOA would not have reasonably expected that Applicants' invention would result in cores and molds having improved properties.

Assuming *arguendo* that TPSOA would have been motivated by reading the '567 patent to use an alkyl ester of a fatty acid, wherein the alkyl group of the ester has from 4 to 8 carbon atoms, there is no teachings in the '567 patent that would lead TPSOA to reasonably expect that the use of such a fatty acid would produce cores and molds with improved properties. And the data in Applicants' patent specification clearly indicate that the use of such esters results in cores with improved tensile strengths. See pages Tables I to III at pages 14-15 of Applicants' patent application and the remarks made in connection with the experiments described therein.

C. The '567 patent is not prior art under 35 U.S.C. §103 (a).

Applicants have submitted copies of assignments for the subject patent application and U.S. Patent 6,604,567 and a Declaration related to the ownership of the subject application and U.S. Patent 6,604,567. The assignments show that the subject application and U.S. Patent 6,604,567 were owned by a common assignee, namely Ashland Inc., at the time the subject matter of claims 1-11 was made. Therefore, U.S. Patent 6,604,567 is not prior art according to the provisions of 35 U.S.C. §103 (c) (1).

Claims 1-6 and 9-11 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Woodson '576 (US 4,806,576, cited on IDS dated 7/25/2003) in view of Garbsch et al (DE 19727540, cited on IDS dated 7/25/2003).

Woodson '576 discloses a curable epoxy resin composition (col. 18, lines 4-66) used in foundry-making (col. 19, line 42 to col. 20, line 42) comprising a major amount of foundry aggregate (col. 7, lines 14-24) and a binder comprising 30-50 wt % of an epoxy resin such as that derived from bisphenol A and having an epoxide equivalent of about 175-210 (col. 5, line 5); up to 50 wt % (col. 7, line 10) of a trifunctional acrylate such as trimethylolpropane triacrylate (col. 6, lines 57-58); and 15-40 wt % of a peroxide such as cumene hydroperoxide (col. 5, line 58 to col. 6, line 11) that is cured in the presence of sulfur dioxide.

Woodson 576 is silent with respect to the addition of a fatty acid alkyl ester, nevertheless, it is open to the use of other materials that provide additional desirable results (col. 7, lines 25-26).

Garbsch et al discloses foundry binder compositions comprising epoxy resins modified by acrylate monomers (paragraph 14) and teaches that when up to 30 wt % (based on the weight of the binder composition) of a methyl-, ethyl, or propyl- ester of oleic acid added to the binder composition, improved properties such as those disclosed in paragraphs 10-12 are observed.

It is noted that although Garbsch et al does not disclose the presently claimed alkyl groups (i.e., alkyl groups with 4-8 carbon atoms), it is the examiner's position that it would have been obvious to one of ordinary skill in the art to expect similar beneficial results with compounds having only additional $\text{—CH}_2\text{—}$ groups. Case laws holds that homologs (compounds differing regularly by the successive addition of the same chemical group, e.g., by $\text{—CH}_2\text{—}$ groups) are generally of sufficiently close structural similarity that there is a presumed expectation that such compounds possess similar properties. *In re Wilder*, 563 F.2d 457, 195 USP.Q 426 (CCPA 1977).

Given that Woodson '576 is open to the addition of other ingredients which provide desirable results to its foundry binder system and given that Garbsch et al, which is in the same field of endeavor as Woodson '576, teaches that fatty acid alkyl esters impart beneficial properties to a binder system, it would have been obvious to one of ordinary skill in the art to utilize the fatty acid ester as taught by Garbosh et al or an obvious variant thereof in the foundry binder system of Woodson '576 and thereby arrive at the presently cited claims.

Applicants' response

A. TPSOA would not have been motivated to derive Applicants' invention.

The binder of the primary reference, U.S. Patent 4,806,576 (hereinafter referred to as the '576 patent) is similar to Applicant's, except, as the Examiner admits, the binder of the '576 patent does not teach or suggest the use of a fatty acid alkyl ester, wherein the alkyl group of the ester has from 4 to 8 carbon atoms. Therefore, the question is whether the secondary reference, DE 19727540 (hereafter referred to as DE'540), would have motivated TPSOA to use such an ester.

DE'540 discloses foundry binder compositions comprising epoxy resins, acrylate monomers, and up to 30 wt % (based on the weight of the binder composition) of a methyl-, ethyl, or propyl- ester of oleic acid. In contrast to this, Applicants' binder contains an alkyl ester of a fatty acid, wherein the alkyl group of the ester has from 4 to 8 carbon atoms.

Applicants submit that because DE'540 specifies using methyl-, ethyl, or propyl- esters of oleic acid, it teaches away from using an alkyl ester having 4 to 8 carbon atoms in the alkyl group. Therefore, TPSOA would not have been motivated to use such esters in the binder of the '476 patent based upon the teachings of DE'540.

Applicants submit that *In re Wilder* is not analogous to the situation here. In *Wilder*, the applicant was attempting to patent a compound, which was a homologue of an existing compound. The homologue compound, which applicants attempted to patent, was known to have properties that were similar to the compound shown in the prior art. Applicants are not claiming a new compound, but instead are claiming a composition, which comprises three components, one of which is alkyl ester having 4 to 8 carbon atoms in the alkyl group. There is nothing in DE'540 that suggests that such alkyl esters are equivalent to those described in DE'540. In fact, DE'540 teaches away from using alkyl ester having 4 to 8 carbon atoms in the alkyl group, since it expressly states that methyl-, ethyl-, or propyl- ester of oleic acid must be used.

B. TPSOA would not have reasonably expected that Applicants' invention would result in cores and molds having improved properties.

Assuming *arguendo* that TPSOA would have been motivated by reading the '576 patent to use an alkyl ester of a fatty acid, wherein the alkyl group of the ester has from 4 to 8 carbon atoms, there are no teachings in the '576 patent that would lead TPSOA to reasonably expect that the use of such fatty acids would produce cores and molds with improved properties. The data in Applicants' patent specification clearly indicate that the use of such esters results in that improved tensile strengths.

Claims 7-11 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Woodson (US 4,806,576, cited on IDS dated 7/25/2003) in view of Garbsch et al (DE 19727540, cited on IDS dated 7/25/2003) and further in view of *Hawley's Condensed Chemical Dictionary* ("oleic acid").

The discussion set forth in paragraph 7 above with respect to Woodson '576 and Garbsch et al is incorporated here by reference.

Neither Woodson '576 nor Garbsch et al does not disclose the use of butyl tallate in its foundry binder compositions, however, Garbsch et al discloses the use of an alkyl ester of oleic acid.

Hawley 's teaches that oleic acid is a component of tall oil.

Given that the use of an oleic acid alkyl ester is disclosed by Garbsch et al and given that it is known that oleic acid is a component of tall oil as taught by *Hawley's*, it would have been obvious to one of ordinary skill in the art to utilize an alkyl ester of tall oil which comprises oleic acid and thereby arrive at the presently cited claims.

Applicants' response

A. TPOSA would not have been motivated to derive Applicants' invention.

Applicants submit that the teachings in *Hawley's Condensed Chemical Dictionary*, when combined with the '576 patent and DE'540, would not have motivated TPOSA to discover the binder of claims 7-11.

First, in order to derive the binder of claims 7-11, TOPSA would have to have been motivated to read the '576 patent and consider modifying it. Assuming that TOPSA would have been motivated to modify the '576 patent by the teachings of DE'540, the Examiner implicitly admits that TPOSA would not have discovered Applicants' invention. Otherwise, it would not have been necessary to combine the '576 patent and DE'540 with *Hawley*. Therefore, the question is whether TPOSA would have been motivated by *Hawley* to discover Applicants' invention in view of the teachings of the '576 patent and DE'540.

Applicants submit that TPOSA, knowing what the '576 patent and DE'540 taught, would not have even been motivated to look up the definition of "oleic acid". This assumption underlies the Examiner's rejection, but the Examiner does not explain why there would have been such motivation.

But assuming *arguendo* that there was some motivation for TPOSA to read *Hawley* after reading the '576 patent and DE'540, there still is the question of whether TPOSA would have been motivated by *Hawley* to use butyl tallate. Applicants submit that TPOSA would not have been so motivated.

First, it should be mentioned that the definition in *Hawley*, which the Examiner refers to, is the definition of "oleic acid", not "esters of oleic acid". Secondly, all that *Hawley* says is that oleic acid is a fatty acid found in almost all natural fats, as well as tall oil. Applicants submit that this definition of "oleic acid" would not have motivated TPOSA

to use butyl tallate, or any other alkyl esters having 4-8 carbon atoms, when combined with the '476 patent and DE '540.

B. TPSOA would not have reasonably expected that Applicants' invention would result in cores and molds having improved properties.

Assuming *arguendo* that TPSOA would have been motivated by '576 patent, DE'540, and *Hawley* to use butyl tallate, there is no teaching in these references that would lead TPSOA to reasonably expect that the use of such fatty acids would produce cores and molds with improved properties. The data in Applicants' patent specification clearly indicate that the use of butyl tallate results in that improved tensile strengths. See pages Tables I to III at pages 14-15 of Applicants' patent application and the remarks made in connection with the experiments described therein.

Claims 1-6 and 9-11 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Kwasniok et al (DE 19727540) alone or Kwasniok et al in view of Aizpurua et al (*J. Appl. Poly. Sci.* Vol. 76, 1269-1279).

Kwasniok et al discloses a cold setting binder used in the foundry industry comprising a binder such as those disclosed on the paragraph bridging pages 6 and 7 and 5-30 wt% based on the total weight of binder of methyl, ethyl, and/or propyl esters of oleic acids (page 7, lines 7-8). Note examples I and 7 where a foundry mix is prepared by mixing 59.5 parts by weight of a commercially available epoxy resin such as Rutapox 0164, 25.5 parts by weight of trimethylol propane triacrylate, 15 parts by weight of rapeseed oil methyl ester, cumene hydroperoxide, and sand.

Kwasniok et al does not explicitly disclose from what the epoxy resin is derived nor the epoxide equivalent weight of the epoxy resin, nevertheless, Kwasniok et al exemplifies the use of an epoxy resin, i.e., Rutapox 0164.

Aizpurua et al teaches that Rutapox 0164 has is a diglycidyl ether of bisphenol-A and has an epoxy equivalent weight of 188 (page 1270).

Given that Kwasniok et al exemplifies the use of an epoxy resin intrinsically having the presently claimed characteristics, it would have been obvious to one of ordinary skill in the art to utilize a resin with those characteristics.

It is noted that although Kwasniok et al only teaches the use of methyl, ethyl, and propyl groups and does not disclose the presently claimed alkyl groups having 4-8 carbon atoms, it is the examiner's position that it would have been obvious to one of ordinary skill in the art to expect similar beneficial results with compounds having only additional $\text{—CH}_2\text{—}$ groups. Case laws holds that homologs (compounds differing regularly by the successive addition of the same chemical group, e.g. by $\text{—CH}_2\text{—}$ groups) are generally of sufficiently close structural similarity that there is a presumed expectation that such compounds possess similar properties. *In re Wilder*, 563 E2d 45, 195 USPQ 426 (CCPA 1977).

Applicants' response

A. TP SOA would not have been motivated to derive Applicants' invention.

Applicants have already discussed DE'540. The Examiner evidently concedes that DE'540 alone would not motivate TP SOA to discover Applicants' invention, since he has combined DE'540 with Aizpurua. Therefore, the question that must be resolved is whether Aizpurua would motivate TP SOA to use an alkyl ester having 4-8 carbon atoms in the binder of DE'540.

Applicants concede that Aizpurua teaches that Rutapox 0164 is a diglycidyl ether of bisphenol-A and has an epoxy equivalent weight of 188 (page 1270). But they fail to see how this would motivate TP SOA to use an alkyl ester having 4 to 8 carbon atoms in the alkyl group instead of a methyl-, ethyl, or propyl- ester of oleic acid. There is nothing in the teachings of Aizpurua related to the use of alkyl esters or equivalent chemicals in foundry binders comprising an epoxy resin and an acrylate.

B. TP SOA would not have reasonably expected that Applicants' invention would result in cores and molds having improved properties.

Assuming *arguendo* that TP SOA would have been motivated by reading the DE'540 and Aizpurua to use an alkyl ester of a fatty acid, wherein the alkyl group of the ester has from 4 to 8 carbon atoms, there is no teaching in these references that would lead TP SOA to reasonably expect that the use of such fatty acids would produce cores and molds with improved properties. As was mentioned before, the data in Applicants' patent specification clearly indicate that the use of such esters results in that improved tensile strengths.

Claim 7-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kwasniok et al (DE19727540) alone or Kwasniok et al in view of Aizpurua et al (J. Appl. Poly. Sci., Vol. 76,1269-1279) and further in view of Hawley's Condensed Chemical Dictionary ("oleic acid").

The discussion set forth in paragraph 2 above with respect to Kwasniok et al is incorporated here by reference.

Applicants' response

A. TPSEA would not have been motivated to derive Applicants' invention.

Applicants submit that the teachings in *Hawley's Condensed Chemical Dictionary*, when combined with the DE'540 and Aizpurua, would not have motivated TPOSA to discover the binder of claims 7-11.

First, in order to derive the binder of claims 7-11, TOPSA would have to have been motivated to read the DE'540 and consider modifying it. Assuming that TOPSA would have been motivated to modify the DE'540 by the teachings of Aizpurua, the Examiner implicitly admits that TPSEA would not have discovered Applicants' invention. Otherwise, it would not have been necessary to combine DE'540 and Aizpurua with *Hawley*. Therefore, the question is whether TPSEA would have been motivated by *Hawley* to discover Applicants' invention in view of the teachings of DE'540 and Aizpurua.

Applicants submit that TPOSA, knowing what DE'540 and Aizpurua taught, would not have even been motivated to look up the definition of "oleic acid". This assumption underlies the Examiner's rejection, but the Examiner does not explain why there would have been such motivation.

But assuming *arguendo* that there was some motivation for TPOSA to read *Hawley* after reading DE'540 and Aizpurua, there still is the question of whether TPSEA would have been motivated by *Hawley* to use butyl tallate. Applicants submit that TPSEA would not have been so motivated.

First, it should be mentioned that the definition in *Hawley*, which the Examiner refers to, is the definition of "oleic acid", not "esters of oleic acid". Secondly, all that *Hawley* says is that oleic acid is a fatty acid found in almost all natural fats, as well as tall oil. Applicants submit that this definition of "oleic acid" would not have motivated TPOSA to use butyl tallate, or any other alkyl esters having 4-8 carbon atoms, when combined

with DE'540 and Aizpurua.

B. TPSOA would not have reasonably expected that Applicants' invention would result in cores and molds having improved properties.

Assuming *arguendo* that TPSOA would have been motivated by reading DE'540, Aizpurua, and *Hawley*, there is no teaching in these references that would lead TPSOA to reasonably expect that the use of such fatty acids would produce cores and molds with improved properties.

Claims 12 and 13 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Kwasniok et al (DE 19727540) alone or Kwasniok et al in view of Aizpurua et al (J. Appl. Poly. Sci. Vol. 76, 1269-1279) and further in view of Hawley's Condensed Chemical Dictionary ("oleic acid" and "casting"). Claims 12 and 13 were further rejected under 35 U.S.C. 103 (a) as being unpatentable over Woodson '576 (US 4,806,576, cited on EDS dated 7/25/2003) in view of Kwasniok et al (DE 19727540) and further in view of Hawley's Condensed Chemical Dictionary ("oleic acid" and "casting").

Applicants' response

Claims 12 and 13 were canceled.

Double Patenting

Claims 1-13 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-15 of U.S. Patent No. 6,604,567. Although the conflicting claims are not identical, they are not patentably distinct from each other because of the reasons given below.

US '567, like the present claims, discloses a foundry binder system comprising epoxy resin, acrylate, and peroxide. Although US '567 does not explicitly claim the use of an alkyl ester of a fatty acid, such is clearly within the scope of US '567's claims given the open claim language "comprising." In passing, it is noted that the specification refers to the addition of an alkyl ester of a fatty acid such as that presently claimed at col. 4, lines 28-50.

Applicants' Response

Ashland's patent rights will soon be assigned to an IP holding company. When this assignment is executed, a copy will be provided to the Examiner, and then a terminal disclaimer will be filed, which is executed on behalf of the IP holding company.

SUMMARY

Applicants submit that claims 1-11 are not anticipated or obvious:

1. Motivation

TPSOA would not have been motivated to use an ester containing an alkyl group of an ester having from 4 to 8 carbon atoms in a foundry binder comprising an epoxy resin and an acrylate.

2. Reasonable expectation of success

TPSOA would not have reasonably expected that cores and molds made with a binder comprising an epoxy resin, and acrylate, and an ester, having an alkyl group of an ester having from 4 to 8 carbon atoms, would produce cores and molds having improved properties.

3. Level of ordinary skill in the art

TPSOA knows that this field of technology related to foundry binders has been developing for decades and that the art related to this technology is crowded. Applicants' submit that innovations are incremental in nature and making new discoveries is like finding the proverbial "needle in a haystack".

4. Use of "hindsight"

In view of the circumstances, Applicants submit that their invention could only be derived from the references by the use of "hindsight". TPOSA does not have the advantage of knowing what the invention is. In this regard, Applicants believe the discussion in *In re Kotzab*, 55 U.S.P.Q. 2d 1313 (Fed. Cir. 2000) at page 1317 is relevant:

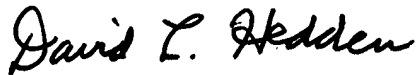
A critical step in analyzing the patentability of claims pursuant to section 103(a) is casting the mind back to the time of invention, to consider the thinking of one of ordinary skill in the art, guided only by the prior art references and the then-accepted wisdom in the field. See *Dembiczak*, 175 F.3d at 999, 50 USPQ2d at 1617. Close adherence to this

methodology is especially important in cases where the very ease with which the invention can be understood may prompt one "to fall victim to the insidious effect of a hindsight syndrome wherein that which only the invention taught is used against its teacher."³ *Id.* (quoting *W.L. Gore & Assocs., Inc. v Garlock, Inc.*, 721 F.2d 1540, 1553, 220 USPQ 303,313 (Fed. Cir. 1983)).

CONCLUSION

Applicants submit that the application is now in condition for allowance and respectfully request a notice to this effect. If the Examiner believes further explanation of Applicants' position is needed, Applicants' attorney will discuss this matter over the telephone or visit the Examiner personally if this may be useful.

Respectfully submitted,



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³ Underlining added for emphasis.